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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Marianne Hammer-Altmann

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EXAMINER

KOSLOW, CAROL M

ART UNIT

PAPER NUMBER

1793

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/539,913	<b>Applicant(s)</b> HAMMER-ALTMANN ET AL.	
	<b>Examiner</b> C. Melissa Koslow	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 9-15 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-13 and 20-22 is/are rejected.
- 7) ☒ Claim(s) 14 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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This action is in response to applicants' amendment of 13 April 2008. The amendments to the specification have overcome the 35 USC 132(a) objection. The amendments to the claims have overcome the 35 USC 112, first paragraph rejection and the 35 USC 112, second paragraph rejection over claims 11 and 13. Applicants arguments with respect to the objections to the disclosure are persuasive and the objection is withdrawn. The term "dopant" and "doped" is being given meanings of these terms in U.S. patent 6,773,621, which is that the dopants are part of the crystal structure as shown by the formula in U.S. patent 6,773,621, where  $A^1$ ,  $A^2$ ,  $B^1$ ,  $B^2$  and  $B^3$  are dopants and their presence means the PZT is doped with these materials. Applicant's arguments with respect to the remaining rejections have been fully considered but they are not persuasive.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites the limitation "the rare earth metal". There is insufficient antecedent basis for this limitation in the claim or in claim 11. Claim 11 teaches rare earth metals.

Applicants state that claim 11 was amended to "a rare earth metal". This amendment is not present in the claims. Thus the rejection is maintained. If claim 11 is amended as argued, this rejection will be overcome.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 9-13 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent 5,993,895.

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This reference teaches adding a lithium salt to PLZT powder, which is a lanthanum doped PZT ceramic. While the reference does not teach how the PLZT is produced, it is notoriously well known in the art that this material is conventionally produced by mixing oxides of lead, lanthanum, zirconium and titanium and calcining the mixture. Table 1 teaches adding 0.84 and 1 wt% lithium nitrate, which is 0.084 and 0.1 wt% ionic lithium. The reference teaches the claimed process. Since the taught composition and process are identical to that claimed, the sintering temperature obtained by the taught method must be within the ranges of claims 9 and 20, absent any showing to the contrary.

Claims 9-13 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 5,993,895.

This reference teaches adding a lithium salt to PLZT powder, which is a lanthanum doped PZT ceramic. While the reference does not teach how the PLZT is produced, it is notoriously well known in the art that this material is conventionally produced by mixing oxides of lead, lanthanum, zirconium and titanium and calcining the mixture. The lithium salt can be lithium nitrate or lithium carbonate and the amount is 0.5-10 wt%. If the salt is lithium nitrate, the ionic amount of lithium added is 0.05-1 wt% and if the salt is lithium carbonate, then the amount of ionic lithium is 0.095-1.9 wt%. These ranges overlap the claimed range. Product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960). Since the taught and claimed compositions overlap and the taught and claimed processes are the same, one of ordinary skill in the art would expect the sintering temperature

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range obtained for the taught mixture to overlap the claimed sintering temperature range, absent any showing to the contrary.

This reference teaches the ceramic is used to form a multilayered capacitor having internal electrodes. This structure is the same as an actuator and thus the capacitor would also act as an actuator in different applications. While the taught electrodes are composed of silver/palladium alloy, it is well known in the art that silver is a functionally equivalent electrode material that also requires the sintering temperature to be less than 1100°C. Thus it would have been obvious to use a silver electrode in place of the taught alloy. In addition, it would have been obvious to use the taught capacitor/actuator in a motor vehicle fuel injection system since this is a well known use of piezoelectric actuators. The reference suggests the claimed process, actuator and system.

Applicants' arguments have been considered but are not convincing since they have not shown that a sintering temperature in the range of 850-950°C cannot be obtained for the taught mixtures of PLZT and lithium nitrate. The teachings in column 3, lines 20-28 that a sintering temperature of 1000°C for two hours does not indicate that the ceramic cannot be sintered at lower temperatures for longer times. Column 2, lines 56-58 teaches that the sintering occurs at temperatures at 1100°C for a time sufficient to density, or sinter, the mixture. Thus the reference does suggest sintering at temperatures less than 1100°C and even less than 1000°C for times longer than 2 hours. It is well known in the ceramic art that sintering conditions are based on both time and temperature and that these variables can be varied by increasing the temperature which decreases the sinter time or by decreasing the temperature which increases the sintering time. Applicants claim the sintering temperature as a property and they have not shown that the taught

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composition does not have this property. Applicants do not claim sintering the mixture at 850-950°C, they only state that a sintering temperature in the range can be obtained from mixing a PZT based ceramics and 0.01-0.1 wt% of lithium in salt form.

Applicants argue that the molar ratio of Pb to Ti and Zr or the relative molar percentage of oxygen from oxides is not taught by the reference. The reason why the reference does not teach this is because the formula for PLZT is well known in the art as shown by U.S. patent 3,666,666. U.S. patent 3,666,666 shows that PLZT have the general formula  $\text{Pb}_{1-x}\text{La}_x(\text{Ti}_z\text{Zr}_{1-z})_{1-x/4}\text{O}_3$ . Thus the PLZT of U.S. patent 5,993,895 has a oxygen molar percentage that matches the formula of claim 9. With respect to the ratio of Pb to Zr and Ti, U.S. patent 6,773,621 shows that doping PZT ceramics affects the ratio of Pb to Zr and Ti so that it is no longer 1, as in the general formula of claim 9. Therefore, the fact that PLZT do not have the Pb/Zr and Ti ratio of claim 9, the teachings of claims 11 and 12 would change this ratio. Thus the arguments over the composition claims 9-13 and 20 are not convincing and these rejections are maintained.

Applicants arguments with respect to claims 21 and 22 are a repeat of those made previously and are not convincing for the reasons given previously. The rejection is maintained.

Claims 14 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

There is no teaching or suggestion in the cited art of record of the claimed process where the PZT based ceramic is doped with Ca, La, Nb, Fe and Cu.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa Koslow whose telephone number is (571) 272-1371. The examiner can normally be reached on Monday-Friday from 8:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo, can be reached at (571) 272-1233.

The fax number for all official communications is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/cmk/  
May 27, 2009

/C. Melissa Koslow/  
Primary Examiner  
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